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United States Patent [19]

Shirato et al.

[11] **Patent Number:** 5,933,165[45] **Date of Patent:** *Aug. 3, 1999[54] **INK JET RECORDING APPARATUS AND METHOD USING INK JET HEAD HAVING U-SHAPED WIRING**[75] **Inventors:** Yoshiaki Shirato, Yokohama; Yasushi Takatori, Sagamihara; Toshitami Hara, Tokyo; Yukuo Nishimura, Sagamihara; Michiko Tanaka, Obizumimachi, all of Japan[73] **Assignee:** Canon Kabushiki Kaisha, Tokyo, Japan[*] **Notice:** This patent is subject to a terminal disclaimer.[21] **Appl. No.:** 08/407,397[22] **Filed:** Mar. 17, 1995**Related U.S. Application Data**

[63] Continuation of application No. 08/159,709, Dec. 1, 1993, abandoned, which is a continuation of application No. 07/998,053, Dec. 29, 1992, abandoned, which is a division of application No. 07/711,418, Jun. 5, 1991, Pat. No. 5,204,689, which is a continuation of application No. 07/632,610, Dec. 27, 1990, abandoned, which is a continuation of application No. 07/403,860, Sep. 1, 1989, abandoned, which is a continuation of application No. 07/188,071, Apr. 28, 1988, abandoned, which is a continuation of application No. 07/013,172, Feb. 9, 1987, abandoned, which is a continuation of application No. 06/846,472, Mar. 31, 1986, abandoned, which is a continuation of application No. 06/750,985, Jul. 1, 1985, abandoned, which is a continuation of application No. 06/639,531, Aug. 9, 1984, abandoned, which is a continuation of application No. 06/543,224, Oct. 20, 1983, abandoned, which is a continuation of application No. 06/362,579, Mar. 29, 1982, abandoned, which is a continuation of application No. 06/132,774, Mar. 24, 1980, abandoned.

[30] **Foreign Application Priority Data**

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[51] **Int. Cl.⁶** B41J 2/05[52] **U.S. Cl.** 347/58[58] **Field of Search** 347/58, 63-65, 347/208, 209, 210, 211[56] **References Cited****U.S. PATENT DOCUMENTS**

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[57]

ABSTRACT

An ink jet recording method includes the steps of providing an ink jet recording head having a plurality of discharge openings for discharging ink, a plurality of liquid passageways for holding ink and a plurality of heat generating members. Each of the heat generating members corresponds to a liquid passageway and each heat generating member has a pair of electrodes for driving the heat generating member individually and the electrodes and corresponding heat generating member form a U-shaped wiring portion. The recording head may be manufactured using a cutting process. A voltage is applied to selected pairs of electrodes for driving selected heat generating members individually for providing thermal energy to the ink in the liquid passageway for abruptly forming a bubble and discharging ink from the discharge opening and recording on a recording medium.

5 Claims, 5 Drawing Sheets